DOCUMENT RESUME

ED 471 189 CS 511 473

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TITLE	Listening Objectives in the Mathematics Curriculum.
PUB DATE	2002-00-00
NOTE	8p.
PUB TYPE	Guides - Non-Classroom (055) -- Opinion Papers (120)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Classroom Techniques; Elementary Secondary Education; *Listening Comprehension; *Listening Skills; *Mathematics Instruction; *Student Educational Objectives; Teacher Role
IDENTIFIERS	*Listening Strategies; Mandated Tests; NCTM Curriculum and Evaluation Standards

ABSTRACT

Many students exhibit poor listening habits in the classroom, so that elementary and secondary teachers must do much repeating and reteaching of material. It is particularly important for students to listen well to achieve as much as possible in the mathematics curriculum. There are a plethora of sources available from which to select objectives in listening, including the National Council of Teachers of Mathematics (NCTM) publication entitled "Curriculum and Evaluation Standards for School Mathematics," a book which cites standards that pertain to communication, reasoning, and connections. To achieve NCTM's standards students will be listening to teacher directed learning activities, peer discussions, student participation in inductive and deductive learning experiences, demonstrations, problem solving activities, reflections on multimedia presentations, and basal textbook exercises. In addition to NCTM objectives, state-mandated objectives need to be implemented. State-mandated objectives have accompanying tests to measure learner achievement. Learning opportunities are chosen by the teacher to assist students in achieving the mandated objectives. In addition to NCTM objectives and state-mandated objectives, the teacher may wish to emphasize significant objectives in listening based on personal observations of children in the classroom. Conditions which hinder optimal student learning need to be assessed and positive changes made. Contains 9 references. (NKA)

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Listening Objectives in the Mathematics Curriculum.

by Marlow Ediger

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LISTENING OBJECTIVES IN THE MATHEMATICS CURRICULUM

When being an elementary, middle, school, and senior high school instructor, my experiences indicated that much repeating and reteaching needed to be done due to poor listening habits of pupils. When supervising university student teachers, the involved cooperating teachers would say to me that "Bill should have gotten that, but he was not listening." To be sure, there are pupils who are preoccupied with grave problems and, perhaps, cannot concentrate. It was difficult for me to concentrate when in the fifth grade, may mother suffered a disabling stroke. She could not speak clearly, walk independently, nor use her right arm. This condition continued for 22 years before her death. It was indeed a shattering experience for a fifth grader, and, I must say, that my thoughts were on mother's condition, not on my studies, especially in grade five. But, the human being has resilience and is able to bounce back to a large degree ultimately. Some will do a better job of "bouncing back" toward equilibrium than others. The human condition is rather tenuous with its many uncertainties. Pupils need to be assisted to deal with tragedies in life (Ediger 2002, 145- 152).

Beyond these unfortunate situations, pupils need to become good listeners so that they can achieve as much as possible in the mathematics curriculum. Each needs to achieve optimally.

Objectives in Listening in Mathematics

There are a plethora of sources available from which to select objectives. One well known source is the National Council Teachers of Mathematics (NCTM) book titled, Curriculum and Evaluation Standards for School Mathematics. The NCTM (!989) Standards that pertain to communication, reasoning, and connections, kindergarten- grade four are the following examples:

Standard 2: Mathematics as Communication. In grades k- 4, the study of mathematics should include numerous opportunities for communication so that students can:

1. relate physical materials, pictures, and diagrams to mathematical ideas
2. reflect and clarify their thinking about mathematical situations and ideas
3. relate their everyday language to mathematical language and symbols

4. realize that representing, discussing, reading, writing and listening to mathematics are a vital part of learning and using mathematics.

To achieve each of the above named objectives, pupils will be listening to teacher directed learning activities, peer discussions, pupil participation in inductive and deductive learning experiences, demonstrations, problem solving activities, reflecting on multimedia presentations, and basal textbook exercises.

Listening habits can be facilitated through a variety of activities inherent in achieving mathematics objectives. The following should be emphasized to improve listening and learning in mathematics:

1. the teacher reading aloud a word problem in mathematics and having a pupil repeat what was said in the learner's very own words.
2. the teacher assessing how well each pupil listened when having the opportunity to participate in a class discussion.
3. the teacher noticing how often mathematics subject matter is repeated so that pupil's comprehend. It is difficult for the teacher to know if the repetition is needed due to not understanding a process in mathematics or if it is due to lack of listening carefully.
4. the teacher needs to assess the self to determine if poor quality teaching is at fault for pupils lacking understanding of that which was taught. If pupils do not understand content taught, listening skills will, no doubt, suffer. Video taping lessons and assessing each can help in ascertaining if teaching for understanding is in evidence. Teachers may video tape lessons and then assist each other in the assessment to improve instruction. Better listening hopefully will occur.
5. the teacher should evaluate if he/she spends enough time in assisting pupils to perceive purpose for learning. Adequate time needs to be spent in guiding pupils to perceive reasons for acquiring selected mathematical knowledge, skills, or attitudes. Lack of purpose for learning can make for poor listening habits.
6. the teacher needs to notice if pupils depend upon repeating what was taught. Pupils can come to depend upon the teacher repeating subject matter and the feeling being that good listening is not necessary. Thus, a pupil may feel that If mathematical ideas are not secured the first time, there will be adequate chances to acquire these the next time around.
7. the teacher might not be able to obtain pupil attention

when teaching mathematics; as a result, pupil listening suffers. The teacher needs to engage pupils in learning through a variety or materials of instruction such as concrete activities (manipulative, real objects, and items in the environment), semiconcrete (illustrations, drawings, and multimedia), as well as the abstract (reading numerals and word problems for solution, discussions, oral and written reports, as well as writing diary and journal entries).

8. the teacher needs to select experiences for pupils which are related to mathematical problems in the real world. Thus, what is learned in mathematics is useful in the societal arena. The level of application in teaching and learning situations is salient to emphasize.

9. the teacher needs to capture pupil interest in order to encourage improved listening. With proper voice inflection (stress, pitch, enunciation, and juncture), the teacher can become more dynamic in teaching pupils.

10. the teacher needs to provide developmental activities which harmonize with each pupil's present stage of achievement whereby learnings are not too complex to acquire nor too easy, making for boredom (See Ediger and Rao, 2003, Chapter Thirteen).

In addition to NCTM objectives, state mandated objectives need to be implemented. State mandated objectives have accompanying tests to measure learner achievement. The objectives are usually available to teachers to use as benchmarks in teaching mathematics. Learning opportunities are chosen by the teacher to assist pupils in achieving the mandated objectives. Being able to listen well will make for more optimal achievement as compared to listening poorly to ongoing instruction. The mathematics teacher needs to assist pupils to achieve adequate background information in order to benefit from the new lesson to be presented. The accompanying state mandated tests need to be valid and cover that which was taught. Selected concepts which might be covered in the test in terms of multiple choice test items include the following:

1. sets and mathematical sentences.
2. structural ideas or properties in mathematics.
3. basic addition, subtraction, multiplication, and division facts.
4. algorisms for each of the above four named operations using whole numbers.
5. prime numbers, composite numbers, and integers.
6. addition, subtraction, multiplication, and division of

fractional numbers.

7. operations on each of the above named numerals using decimals and per cents.

8. metric and non-metric geometry.

9. other systems of numeration such as base five and base two.

10. uses for functions, probability and statistics (Ediger and Rao, 2003, 432).

Thus, pupils need to attach meaning to new vocabulary terms to be encountered. Mathematics has its own unique vocabulary (greater than, less than, sum, product, difference, quotient, commutative, associative, and distributive, among others). Reading word problems can make for a lack of meaning in the curriculum. The teacher here may need to read orally selected word problems to pupils. Readiness factors for learning mathematical ideas need to be in evidence (Ediger and Rao, 2000, Chapter Three).

In addition to NCTM objectives and state mandated objectives, the teacher may wish to emphasize significant objectives in listening based on personal observations of children in the classroom:

1. to recall factual information, generalizations, and summaries in mathematics.

2. to attach meaning to content presented by others in daily mathematics lessons.

3. to use mathematical ideas, presented orally and gained through listening, within problem solving situations.

4. to analyze subject matter presented in discussions in terms of accurate from inaccurate content, as well as imaginary from reality situations.

5. to want to listen creatively in achieving novel, unique ideas.

6. to listen attentively with the personal goal being to improve listening skills.

7. to achieve an attitude of listening carefully, in an atmosphere of respect, toward the thinking of others.

8. to develop a desire to become a better listener.

9. to diagnose one's own difficulties in listening and working toward remediation of deficiencies.

10. to stress the importance of listening, on one's own, for a variety of purposes (Ediger, ERIC, 2001).

The seating arrangement in the classroom needs to be arranged so that optimal listening may occur. The teacher needs to be closest in proximity to those who possess hearing

impairment problems. Pupils who disrupt others need to be supervised more carefully so that they and others are not robbed of learning opportunities in mathematics. There are diverse seating patterns which may be used in the classroom. These seating arrangements need to be flexible to incorporate heterogeneous and homogeneous grouping of pupils, grouping based on needs such as in necessary diagnostic and remedial work, peer groups whereby pupils assist each other to achieve vital learnings, peer teaching in which a talented learner teaches others in a small group as needed, individual endeavors, the class as a whole, and multi-age grouping. Talented and gifted, average achievers, and slow learners need to be assisted to achieve as much as individual differences can provide. Good listening needs to be encouraged and worked for in the classroom. Standards for optimal listening need to be developed and posted in each classroom. Pupils with teacher guidance need to evaluate if these standards are being met (Ediger, ERIC #ED458525).

The mathematics teacher needs to set objectives for improved pupil listening by

1. presenting subject matter which is meaningful to pupils individually.
2. varying the kinds of learning opportunities provided to promote optimal listening among pupils.
3. emphasizing learning for enjoyment in ongoing activities in mathematics and thus increase listening potential.
4. providing for individual differences among learners in listening skills.
5. attending to maturity and maturation level differences in the classroom (See also Searson and Dunn, 2001).

Listening during mathematics instruction is vital for pupils to achieve vital knowledge, abilities, and positive feelings. The conditions under which pupils learn need to be examined. Those conditions which hinder optimal pupil learning need assessment and positive changes made. In a study on what urban students say about good teaching, Corbett and Wilson (2002) found the following, among others:

Students seemed most disturbed by teachers who allowed discipline problems to affect the quality of their explanations. For example, many students referred to teachers who would say a variant of "I've already told you this; you should have listened the first time" in response to repeated requests for clarification. Although the teachers may have been justified in feeling frustration at the lack of attention that prompted the requests, to

students this phrase meant, "I refuse to teach you."

By contrast, students" faces brightened when they were able to say something like the following:

The teachers are real at ease. They take the time, you know, go step by step. We learn it more. It seems like they got the time to explain it all. We don't have to leave anyone behind.

References

Corbett, Dick, and Bruce Wilson (2002), "What Urban Students Say About Good Teaching, Educational Leadership, 60 (1), 20.

Ediger, Marlow (2002), "Resilience and the Learner," Experiments in Education, 30 (8), 145- 152.

Ediger, Marlow, and D. Bhaskara Rao (2000), Teaching Mathematics Successfully. New Delhi, India: Discovery Publishing House, Chapter Three.

Ediger, Marlow, and D. Bhaskara Rao (2003, Elementary Curriculum. New Delhi, India: Discovery Publishing House, 432.

Ediger, Marlow, and D. Bhaskara Rao (2003), Improving School Administration. New Delhi, India: Discovery Publishing House, Chapter Thirteen.

Ediger, Marlow (2001), "Psychologies of Reading Instruction," ERIC # ED456419.

Ediger, Marlow (2001), "Reading, Grouping, and the Student," ERIC # ED458525.

NCTM (1989), Curriculum and Evaluation Standards for School Mathematics. Reston, Va: National Council Teachers of Mathematics, p. 26.

Searson, Robert, and Rita Dunn (2001), "The Learning Styles Teaching Model, "Science and Children, 38 (5), 22-26.

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